Non-Newtonian fluid is a fluid whose flow rate may vary. The variation of flow rate depends on the applied stress and its duration. In nature, ice, lava, snow, clay suspensions, paints, emulsions, molten rubber, tomato ketchup, and blood are some examples of non-Newtonian fluids. Due to its diversity in nature, several non- Newtonian fluid models have been used to study the behavior of fluid motions. Among the different categories of non-Newtonian fluids, the rate type fluids have received considerable attention due to their various applications in industries. In this thesis, the unsteady magnetohydrodynamic flow of non-Newtonian rate type fluids such as Maxwell fluid, Oldroyd-B fluid, Burgers' fluid and generalized Burgers' fluid are studied in porous and non porous media. Specifically, the problems of Maxwell, Oldroyd-B and Burgers' fluids are considered in a non-rotating frame whereas the generalized Burgers' fluid is considered in a rotating frame. Appropriate non-dimensional variables are used to reduce the governing equations along with imposed boundary and initial conditions into dimensionless forms. The exact solutions of the non-dimensional equations are obtained using Laplace transform technique. The analytical results obtained are plotted for several embedded flow parameters and discussed in detail. The results obtained show that the velocity of the fluid decreases with increasing magnetic parameter whereas it increases for large values of the porosity parameter. It is also shown that the parameters such as rotation, oscillating frequency, time, and rheological fluid parameters have strong influence on the fluid motions. The exact solutions obtained in this study are significant not only because they are solutions of some fundamental flows, but also serve as accuracy standards for approximate methods, whether numerical, asymptotic or experimental. To check the accuracy of the results obtained, the solutions are reduced to their limiting cases where the existing solutions in the literature are recovered as special cases